

IN THE CLAIMS:

1. (Currently Amended) An optical transmitter module, comprising: wherein:
a laser source to output outgoing light;
an etalon positioned to pass part of the outgoing light from a the laser source
therethrough; is made to pass through an etalon as a first ray bundle and is guided
to a first photo-detection means;
a first photo detector positioned to receive the part of the outgoing light
passed through the etalon, to produce a first detection signal;
a second photo detector positioned to receive another part of the outgoing
light not passed through the etalon, to produce a second detection signal;
a laser source driver circuit to receive and compare the first detection signal
and second detection signal, and to drive and control the laser source to
substantially a specific oscillating frequency using feedback based at least in part on
a differential between the first detection signal and second detection signal;
at least the other part of the outgoing light is guided to a second photo-
detection means as a second ray bundle without passing through the etalon;
an oscillating frequency of the laser source is maintained at a specific value,
on the basis of a differential signal between the first and second ray bundle detected
by the first and second photo-detection means;
wherein the etalon is made up of two plate materials includes two plates that
sandwich a media at least one media plate therebetween, and each plate has ; the
two plate materials each have an optical characteristic allowing transmission of the
part of the outgoing light therethrough; that transmits the first ray bundle;

wherein the etalon has a construction where:

~~one end ends of the plate materials are each~~ each plate is fixed to the at least one media plate, and the ~~other ends extend~~ other end extends from the ~~fixed portion~~ at least one media plate to form a cantilever structure, or

a center portion of each plate is ~~the center portions thereof are~~ fixed to the at least one media plate, and the other portions of the plate extend from the ~~fixed portion~~ at least one media plate to form a cantilever structure, or

the at least one media plate includes two first and second media ~~plates, are provided,~~ in which one ~~ends of the plate materials are fixed~~ end of each plate is fixed to the ~~to a~~ first media plate, and the other ~~ends are~~ end of each plate is fixed to a ~~to the~~ second media plate, whereby the ~~plate materials~~ plates and the first and second media plates form an inboard beam structure;

wherein a space ~~combined between portions, facing each other,~~ of the two ~~plate materials, which are not in contact with~~ plates not having the at least one media plate therebetween, serves as a multiple interference region of the etalon; and

wherein each media plate of the at least one media plate is ~~made of~~ a solid material whose coefficient of thermal expansion is 10-7/°C or less.

2. (Currently Amended) An optical transmitter module according to claim 1, wherein the two plates ~~plate materials~~ are optical polished plates.

3. and 4. (Cancelled)

5. (Currently Amended) An optical transmitter module according to claim 1, ~~wherein a ray bundle splitting means for causing the part, as the first ray bundle, of the outgoing light from the laser source to pass through the etalon and guiding the first ray bundle to the first photo-detection means is~~ comprising a semitransparent beam splitter positioned in a path of the outgoing light from the laser source to direct the part of the outgoing light toward the etalon, and to direct the another part of the outgoing light toward the second photo detector.

6. (Currently Amended) An optical transmitter module according to claim 1, wherein either inwardly-facing side ~~of the two sides, facing each other, of the two plate materials~~ plates surrounding the space serving as the multiple interference region has a reflection film thereon, and ~~as a first side, and~~

either outwardly-facing side of the two plates ~~a second side opposite to the first side having the reflection film~~ has a substantially non-reflective film, or is a tilted surface with respect to an optical axis of the part of the outgoing light. ~~an incident light that falls on the plate material.~~

7. (Currently Amended) An optical transmitter module according to claim 1, wherein the plate ~~, of the plate materials constituting the etalon, the plate material placed on the incident side of the first ray bundle~~ part of the outgoing light, is a quarter wavelength plate.

8. (Cancelled)

9. (Currently Amended) An optical transmitter module according to claim 1, ~~wherein comprising a condenser to condense the outgoing light from the semiconductor laser source into a condensed light, are condensed, wherein the etalon is~~ has a tilted posture in the optical path of the condensed light, the ray bundle condensed light having passed through the etalon are ~~is split into two, one of the two split where a first split light is received by the first photodetector, photo-detection means, the other and a second split light is received by the second photodetector, photo-detection means, and the difference of photocurrents of the two photo-detection means~~ first and second photodetectors serves as the ~~a~~ wavelength error detection signal.

10. (Currently Amended) An optical transmitter module according to claim 1, wherein:

the laser source is mounted on a silicon substrate,

the silicon substrate has a reflection surface tilted to the optical axis of the outgoing light, to reflect the another part of the outgoing light to the second photo detector. ~~laser light, which reflects the laser light, and part of the laser light fall on the reflection surface, which has such a slope that the reflected light thereat is reflected in the direction of intersecting the optical axis of the laser beams falling on the tilted surface.~~

11. (Currently Amended) An optical transmitter module according to claim 10, wherein at least the laser source and ~~the~~ a condensing lens are mounted on the silicon substrate, the reflection surface to reflect the another part of the outgoing light coming from the condensing lens to the second photo detector, and the part of the outgoing light not impinging on the reflection surface passing to the etalon. ~~part of the laser light having passed through the condensing lens fall on the tilted surface to be guided to the second photo detection means, and the laser light having not been reflected by the tilted surface are guided to the etalon.~~

12. (Currently Amended) An optical transmitter module according to claim 10, wherein the tilted surface is an etched surface that was formed by means of anisotropic etching with respect to ~~the~~ a crystallinity of the silicon substrate.

13. (Currently Amended) An optical transmitter module according to claim 1, wherein the ~~semiconductor~~ laser source has a light emitting part to output plural light beams of differing wavelengths, ~~capable of oscillating plural wavelengths, and~~ wherein the optical transmitter module comprising a light joiner to join the plural light beams emitted from the light emitting part into a joined outgoing light to act as the outgoing light,

where the etalon positioned to pass part of the joined outgoing light from the laser source therethrough;

the first photo detector positioned to receive the part of the joined outgoing light passed through the etalon, to produce the first detection signal;

the second photo detector positioned to receive the another part of the joined outgoing light not passed through the etalon, to produce the second detection signal;
and

the laser source driver circuit to receive and compare the first detection signal and second detection signal, and to drive and control the laser source to substantially a specific oscillating frequency using feedback based at least in part on the differential between the first detection signal and second detection signal. are joined, ~~part of the joined light beams are is made to pass through the etalon to be guided to the first photo-detection means as the first ray bundle, at least the other part of the outgoing beams are guided to the second photo-detection means without passing through the etalon as the second ray bundle, and the oscillating frequency of the laser source is maintained at a specific value, on the basis of the differential signal between the first and second light beams detected by the first and second photo-detection means.~~

14. (New) A communication system comprising:

at least one input/output unit; and

an optical transmitter module including:

a laser source to output outgoing light;

an etalon positioned to pass part of the outgoing light from the laser source therethrough;

a first photo detector positioned to receive the part of the outgoing light passed through the etalon, to produce a first detection signal;

a second photo detector positioned to receive another part of the outgoing light not passed through the etalon, to produce a second detection signal;

a laser source driver circuit to receive and compare the first detection signal and second detection signal, and to drive and control the laser source to substantially a specific oscillating frequency using feedback based at least in part on a differential between the first detection signal and second detection signal;

wherein the etalon includes two plates that sandwich at least one media plate therebetween, and each plate has an optical characteristic allowing transmission of the part of the outgoing light therethrough;

wherein the etalon has a construction where:

one end of each plate is fixed to the at least one media plate, and the other end extends from the at least one media plate to form a cantilever structure, or

a center portion of each plate is fixed to the at least one media plate, and other portions of the plate extend from the at least one media plate to form a cantilever structure, or

the at least one media plate includes first and second media plates, in which one end of each plate is fixed to the first media plate, and the other end of each plate is fixed to the second media plate, whereby the plates and the first and second media plates form an inboard beam structure;

wherein a space between the two plates not having the at least one media plate therebetween, serves as a multiple interference region of the etalon; and

wherein each media plate of the at least one media plate is a solid material whose coefficient of thermal expansion is $10^{-7}/^{\circ}\text{C}$ or less.

15. (New) An optical transmitter module according to claim 14, wherein the two plates are optical polished plates.

16. (New) An optical transmitter module according to claim 14, comprising a semitransparent beam splitter positioned in a path of the outgoing light from the laser source to direct the part of the outgoing light toward the etalon, and to direct the another part of the outgoing light toward the second photo detector.

17. (New) An optical transmitter module according to claim 14, wherein either inwardly-facing side of the two plates surrounding the space serving as the multiple interference region has a reflection film thereon, and

either outwardly-facing side of the two plates has a substantially non-reflective film, or is a tilted surface with respect to an optical axis of the part of the outgoing light.

18. (New) An optical transmitter module according to claim 14, wherein the plate on the incident side of the part of the outgoing light, is a quarter wavelength plate.

19. (New) An optical transmitter module according to claim 14, comprising a condenser to condense the outgoing light from the semiconductor laser source into a condensed light, wherein the etalon has a tilted posture in the condensed light, the condensed light having passed through the etalon is split into two, where a first split light is received by the first photodetector, and a second split light is received by the second photodetector, and the difference of photocurrents of the first and second photodetectors serves as a wavelength error detection signal.

20. (New) An optical transmitter module according to claim 14, wherein:
the laser source is mounted on a silicon substrate,
the silicon substrate has a reflection surface tilted to the optical axis of the outgoing light, to reflect the another part of the outgoing light to the second photo detector.

21. (New) An optical transmitter module according to claim 20, wherein at least the laser source and a condensing lens are mounted on the silicon substrate, the reflection surface to reflect the another part of the outgoing light coming from the condensing lens to the second photo detector, and the part of the outgoing light not impinging on the reflection surface passing to the etalon.

22. (New) An optical transmitter module according to claim 10, wherein the tilted surface is an etched surface that was formed by means of anisotropic etching with respect to a crystallinity of the silicon substrate.

23. (New) An optical transmitter module according to claim 14, wherein the laser source has a light emitting part to output plural light beams of differing wavelengths, and wherein the optical transmitter module comprising a light joiner to join the plural light beams emitted from the light emitting part into a joined outgoing light to act as the outgoing light,

where the etalon positioned to pass part of the joined outgoing light from the laser source therethrough;

the first photo detector positioned to receive the part of the joined outgoing light passed through the etalon, to produce the first detection signal;

the second photo detector positioned to receive the another part of the joined outgoing light not passed through the etalon, to produce the second detection signal;
and

the laser source driver circuit to receive and compare the first detection signal and second detection signal, and to drive and control the laser source to substantially a specific oscillating frequency using feedback based at least in part on the differential between the first detection signal and second detection signal.